



July 13, 2011

Illinois Environmental Protection Agency  
Permit Section  
Bureau of Land – #33  
1021 North Grand Avenue East  
P.O. Box 19276  
Springfield, IL 62794-9276

US EPA RECORDS CENTER REGION 5



Re: 2018080001 – Winnebago County  
Winnebago Landfill – Northern/Southern Units  
Annual Groundwater Flow Evaluation—2011-2012

Dear Agency Representative:

Pursuant to Condition VIII.20 of Permit No. 1991-138-LF, Modification 54, submitted herein is the facility groundwater flow evaluation. The condition states that annually, the operator shall prepare an evaluation of the groundwater flow direction and the hydraulic gradients at the facility using the groundwater surface elevations determined for each monitoring event. The groundwater flow has been evaluated for the past four quarters (third quarter 2011 through second quarter 2012). Potentiometric surface maps for each of the referenced quarters are provided herein.

If you have any questions regarding this notification, please contact Tom Hilbert at (815) 963-7516.

Sincerely,

A handwritten signature in black ink, appearing to read "Teresa N. Sharp". The signature is fluid and cursive, with a large, stylized "S" at the end.

Teresa N. Sharp  
Environmental Scientist

TNS:tns:slm

Enclosure

cc: Tom Hilbert – Winnebago Reclamation  
Bernie Schorle – US EPA Region 5



**ILLINOIS ENVIRONMENTAL PROTECTION AGENCY  
SOLID WASTE REPORTING FORM**

This form must be used as a cover for the following list of notices and reports required by the Illinois EPA's Bureau of Land, Permit Section. All reports must be submitted to the Illinois EPA's Bureau of Land Permit Section. This form must be used for Solid Waste facilities only. Reporting for Hazardous Waste facilities should be submitted on a separate Hazardous Waste Reporting Form. All reports submitted to the Illinois EPA's Bureau of Land Permit Section must contain an original, plus a minimum of two copies.

Note: This form may NOT be used for any request to modify the permit, sampling or operating procedures. Modification requests must be submitted separately in the form of a permit application.

This form is not to be used with permit applications. Your permit will state whether the document you are submitting is required as a report or an application.

Facility Name: Winnebago Landfill - Northern and Southern Units      Site ID#: 2018080001

Check one of the following, identifying the contents of your submittal:

- |   |   |
|---|---|
| <input type="checkbox"/> LPC-160 Forms  |   |
| <input type="checkbox"/> Quarterly Groundwater Data   | <input type="checkbox"/> Semi-Annual Groundwater Data |
| <input type="checkbox"/> Quarterly Leachate Data  | <input type="checkbox"/> Semi-Annual Leachate Data    |
| <input type="checkbox"/> Annual Groundwater Data  | <input type="checkbox"/> Biennial Groundwater Data    |
| <input type="checkbox"/> Annual Leachate Data   | <input type="checkbox"/> Biennial Leachate Data       |
| <input checked="" type="checkbox"/> Annual Groundwater Flow Evaluation  | <input type="checkbox"/> Well Survey Data             |
| <input type="checkbox"/> Well Construction Forms and Boring Logs  | <input type="checkbox"/> Well Abandonment Forms       |
| <input type="checkbox"/> Notice of Observed Increase in Groundwater<br>Notice of Intent to Perform Confirmation Procedures (Re-sampling) in Groundwater |   |
| <input type="checkbox"/> Notice of Confirmed Increase of Groundwater Exceedence from Re-sample  |   |
| <input type="checkbox"/> Notice of Methane Exceedences  |   |
| <input type="checkbox"/> Annual Facility Report (per 35 Ill. Adm. Code 813.504) and Gas Monitoring Report   |   |
| <input type="checkbox"/> Annual Certifications per 35 Ill. Adm. Code 813.501  |   |
| <input type="checkbox"/> Other (identify): Not to be used for Permit Applications   |   |

# **ANNUAL GROUNDWATER FLOW EVALUATION**

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## **WINNEBAGO LANDFILL – PERMIT NO. 1991-138-LF**

### **2018080001 – WINNEBAGO COUNTY**

In accordance with Condition VIII.20 of Permit No. 1991-138-LF, Modification 54, an evaluation of the groundwater flow and hydraulic gradients for the Northern and Southern Units of Winnebago Landfill has been completed for third and fourth quarters of 2011 and first and second quarters of 2012. The attached potentiometric surface maps illustrate the general groundwater flow direction and gradients for the Northern and Southern Units. Also shown in the attached potentiometric maps is the North Expansion Unit (NEU). The NEU is operated under a separate Permit No. (2006-221-LF). A separate Annual Groundwater Flow Evaluation has been submitted for Permit No. 2006-221-LF. The unit is shown on the potentiometric surface maps because it monitors the same aquifer system as the Northern and Southern Units of Winnebago Landfill and provides a complete illustration of the groundwater flow characteristics.

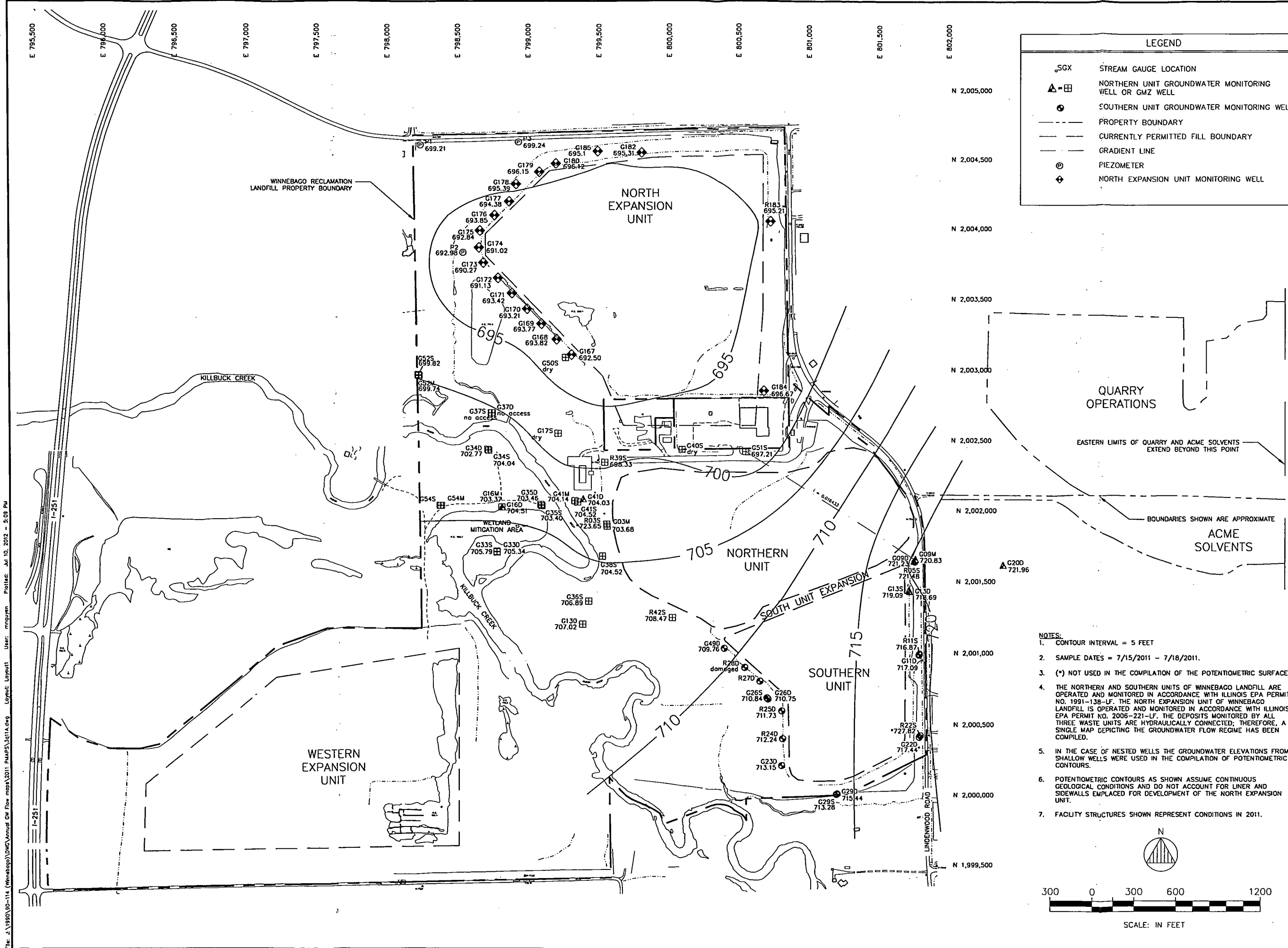
The potentiometric surface data used in construction of the contour maps were obtained from both shallow and deep wells, as the screen intervals are located within deposits that are hydraulically connected.

One hydraulic gradient has been calculated for each quarter. Based on the distance between the selected wells and the change in groundwater elevation, the steepest gradient is represented. The gradient becomes very flat in areas surrounding Killbuck Creek, illustrated by greater distances between contours.

Gradients calculated from wells G09M to G51S (third quarter 2011) and G09M to G184 (fourth quarter 2011 through second quarter 2012) ranged from 0.016433 to 0.018541 during the four quarters of this review. The average gradient for the four quarters was calculated as 0.01764. The gradient is shown on each potentiometric surface map illustrating the flow path used to determine the values.

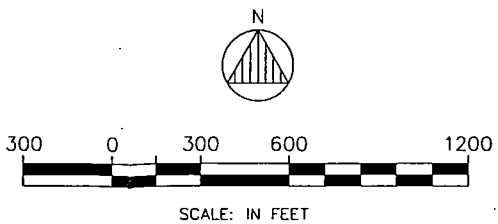
Based on the evaluation of groundwater flow, the existing monitoring well network is appropriate to adequately monitor the facility groundwater. Therefore, no modifications to the monitoring well network are necessary.

File: J:\1990\10-114 (Winnebago)\DWG\Annual CW Flow map\2011 PMA\5-1.gdt Layout1 User: miquyen Plotted: Jul 10, 2012 - 5:09 PM



LEGEND	
SGX	STREAM GAUGE LOCATION
▲-■	NORTHERN UNIT GROUNDWATER MONITORING WELL OR GMZ WELL
●	SOUTHERN UNIT GROUNDWATER MONITORING WELL
---	PROPERTY BOUNDARY
---	CURRENTLY PERMITTED FILL BOUNDARY
---	GRADIENT LINE
⊙	PIEZOMETER
◆	NORTH EXPANSION UNIT MONITORING WELL

- NOTES:
1. CONTOUR INTERVAL = 5 FEET
  2. SAMPLE DATES = 7/15/2011 - 7/18/2011.
  3. (\*) NOT USED IN THE COMPILATION OF THE POTENTIOMETRIC SURFACE.
  4. THE NORTHERN AND SOUTHERN UNITS OF WINNEBAGO LANDFILL ARE OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 1991-138-LF. THE NORTH EXPANSION UNIT OF WINNEBAGO LANDFILL IS OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 2006-221-LF. THE DEPOSITS MONITORED BY ALL THREE WASTE UNITS ARE HYDRAULICALLY CONNECTED; THEREFORE, A SINGLE MAP DEPICTING THE GROUNDWATER FLOW REGIME HAS BEEN COMPILED.
  5. IN THE CASE OF NESTED WELLS THE GROUNDWATER ELEVATIONS FROM SHALLOW WELLS WERE USED IN THE COMPILATION OF POTENTIOMETRIC CONTOURS.
  6. POTENTIOMETRIC CONTOURS AS SHOWN ASSUME CONTINUOUS GEOLOGICAL CONDITIONS AND DO NOT ACCOUNT FOR LINER AND SIDEWALLS EMPLACED FOR DEVELOPMENT OF THE NORTH EXPANSION UNIT.
  7. FACILITY STRUCTURES SHOWN REPRESENT CONDITIONS IN 2011.



REVISIONS	
NO.	DESCRIPTION

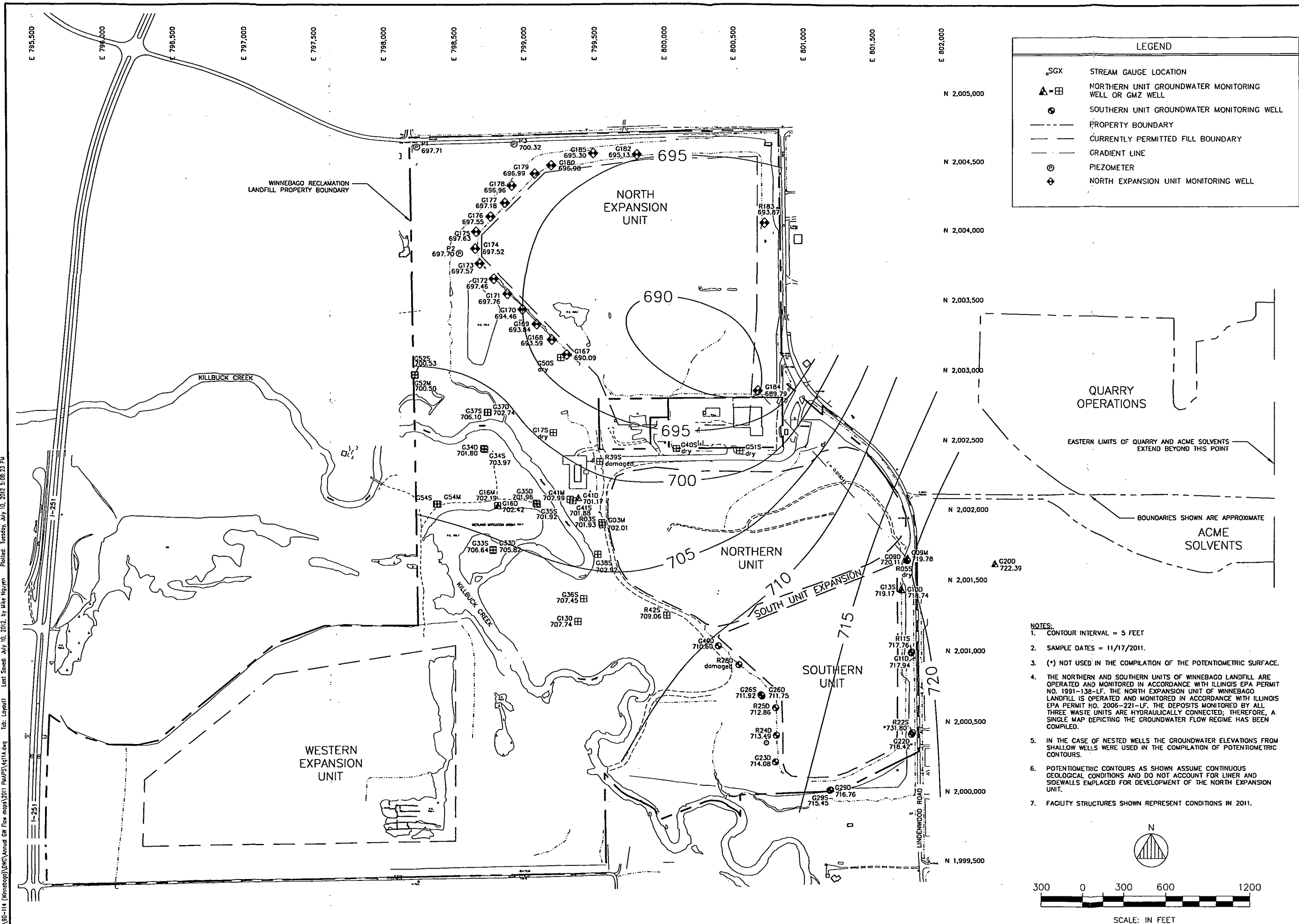
**ANDREWS**  
ENGINEERING, INC.  
3300 Ginger Creek Drive, Springfield, IL 62711-7233  
Tel (217) 787-2334 Fax (217) 787-9495  
Pontiac, IL • Naperville, IL • Indianapolis, IN • Warrington, MO


APPROVED BY: JLR DESIGNED BY: JLR DRAWN BY: MPN

POTENTIOMETRIC SURFACE MAP  
3RD QUARTER 2011

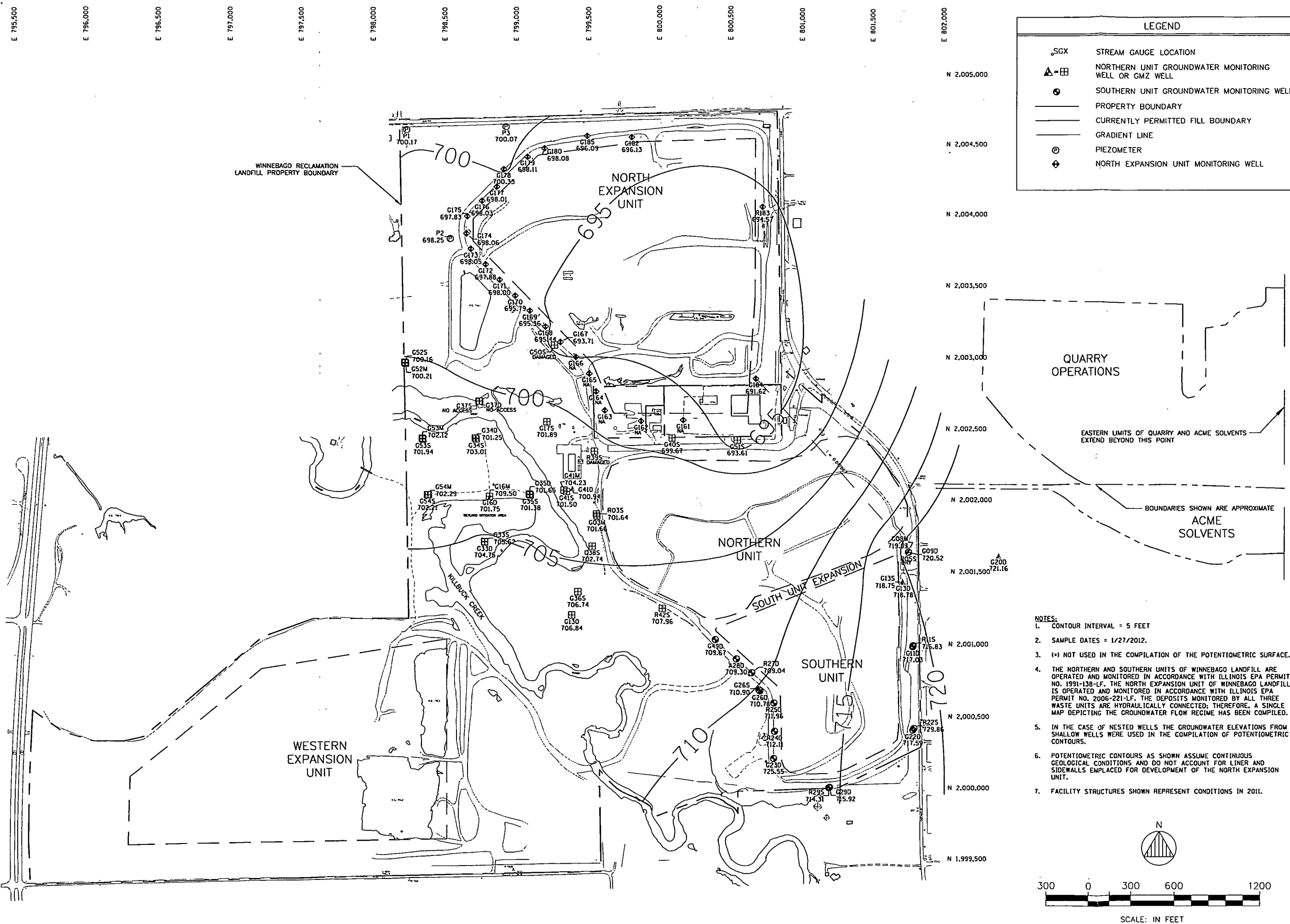
PLANS PREPARED FOR  
WINNEBAGO LANDFILL  
ROCKFORD, WINNEBAGO COUNTY, ILLINOIS

DATE: JULY 2011  
PROJECT ID: 90-114  
SHEET NUMBER: 3011



POTENTIOMETRIC SURFACE MAP 4TH QUARTER 2011		 <b>ANDREWS</b> <b>ENGINEERING, INC.</b> 3300 Ginger Creek Drive, Springfield, IL 62711-7233 Tel (217) 787-2334      Fax (217) 787-9495 Pontiac, IL • Naperville, IL • Indianapolis, IN • Warrenton, MO Professional Design Engineering and Land Surveying Firm #184-001341	REVISIONS			
PLANS PREPARED FOR  WINNEBAGO LANDFILL  ROCKFORD, WINNEBAGO COUNTY, ILLINOIS			NO.	DATE	DESCRIPTION	BY
DATE: July 2012						
PROJECT ID: 90-114						
SHEET NUMBER:						
4011						

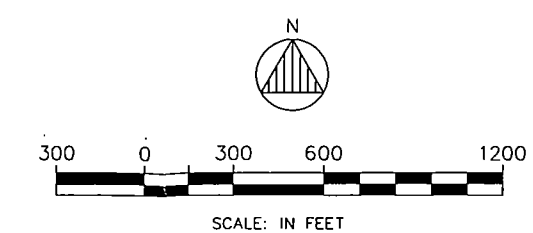
J:\1995\50-114 (Winnebago)\DWG\Winnebago\DWG Flow maps\2012 PUMP\2012 PUMP.dwg Tab: Layout1 Last Saved: July 10, 2012, by Mike Nguyen Plotted: Tuesday, July 10, 2012 5:05:28 PM



**LEGEND**

- SGX STREAM GAUGE LOCATION
- NORTHERN UNIT GROUNDWATER MONITORING WELL OR GMZ WELL
- SOUTHERN UNIT GROUNDWATER MONITORING WELL
- PROPERTY BOUNDARY
- CURRENTLY PERMITTED FILL BOUNDARY
- GRADIENT LINE
- PIEZOMETER
- NORTH EXPANSION UNIT MONITORING WELL

- NOTES:**
1. CONTOUR INTERVAL = 5 FEET
  2. SAMPLE DATES = 1/27/2012.
  3. (+) NOT USED IN THE COMPILATION OF THE POTENTIOMETRIC SURFACE.
  4. THE NORTHERN AND SOUTHERN UNITS OF WINNEBAGO LANDFILL ARE OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 1991-138-LF. THE NORTH EXPANSION UNIT OF WINNEBAGO LANDFILL IS OPERATED AND MONITORED IN ACCORDANCE WITH ILLINOIS EPA PERMIT NO. 2006-221-LF. THE DEPOSITS MONITORED BY ALL THREE WASTE UNITS ARE HYDRAULICALLY CONNECTED; THEREFORE, A SINGLE MAP DEPICTING THE GROUNDWATER FLOW REGIME HAS BEEN COMPILED.
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  7. FACILITY STRUCTURES SHOWN REPRESENT CONDITIONS IN 2011.



REVISIONS		DATE	
NO.	DESCRIPTION	DATE	

**ANDREWS ENGINEERING, INC.**  
3300 Ginger Creek Drive, Springfield, IL 62711-7233  
Tel (217) 787-2334 Fax (217) 787-9495  
Poniac, IL • Naperville, IL • Indianapolis, IN • Warren, MO  
Professional Design Engineering and Land Surveying Firm #04-001541

**POTENTIOMETRIC SURFACE MAP**  
1ST QUARTER 2012

**PLANS PREPARED FOR**  
**WINNEBAGO LANDFILL**  
ROCKFORD, WINNEBAGO COUNTY, ILLINOIS

**DATE:** July 2012  
**PROJECT ID:** 90-114  
**SHEET NUMBER:** 1012

APPROVED BY: JLR DESIGNED BY: JLR DRAWN BY: WCU

03202 Andrews Engineering Inc.

